Net Zero Carbon Plan Roadmap

November 2024

Bec Bennett, Assistant Director of Sustainability

Sustainability at the University of Salford

Sustainability at the University of Salford

Our Sustainability Strategy Vision

By embedding sustainability in all aspects of University life, we will enable our University community to create impactful positive change for society and environment.

Our Sustainability Strategy Goals

- To create a Sustainable Campus
- To enable a Sustainable Impact beyond our campus
- To support Sustainable Communities

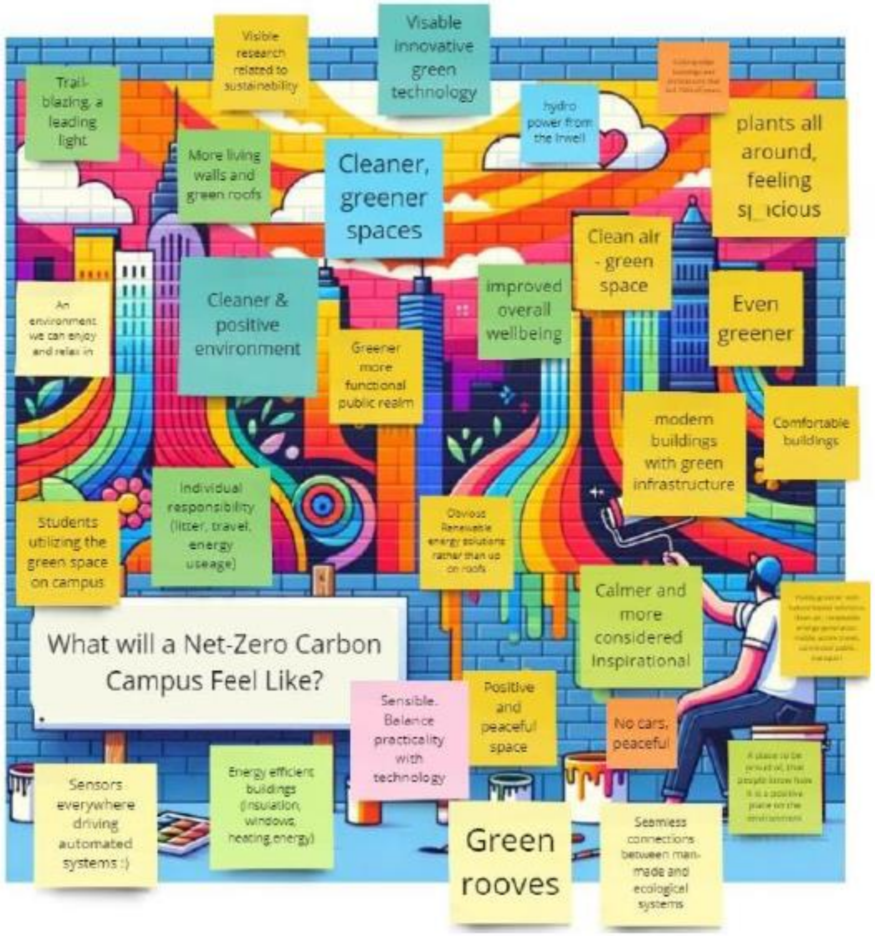
Our Decarbonisation Vision

In line with the science-based target for Greater Manchester, the University is committed to achieving Net Zero Carbon by 2038.

By 2038, the University of Salford will have achieved a decarbonised campus, with scope 1 and 2 carbon emissions reduced by 96% from the 2005/2006 baseline, marking a transformative shift towards a sustainable, low-carbon future.

Fossil fuels will be a practice of the past, replaced by clean, renewable energy sources such as air source heat pumps and solar photovoltaics. State-of-the-art building management systems will optimise energy use across high-performing, energy-efficient buildings.

An energy-conscious culture will be deeply ingrained, with the entire university community actively participating in and benefiting from these decarbonisation efforts, positioning the institution as a leader in the critical transition to a sustainable tomorrow.



Sustainability at the University of Salford

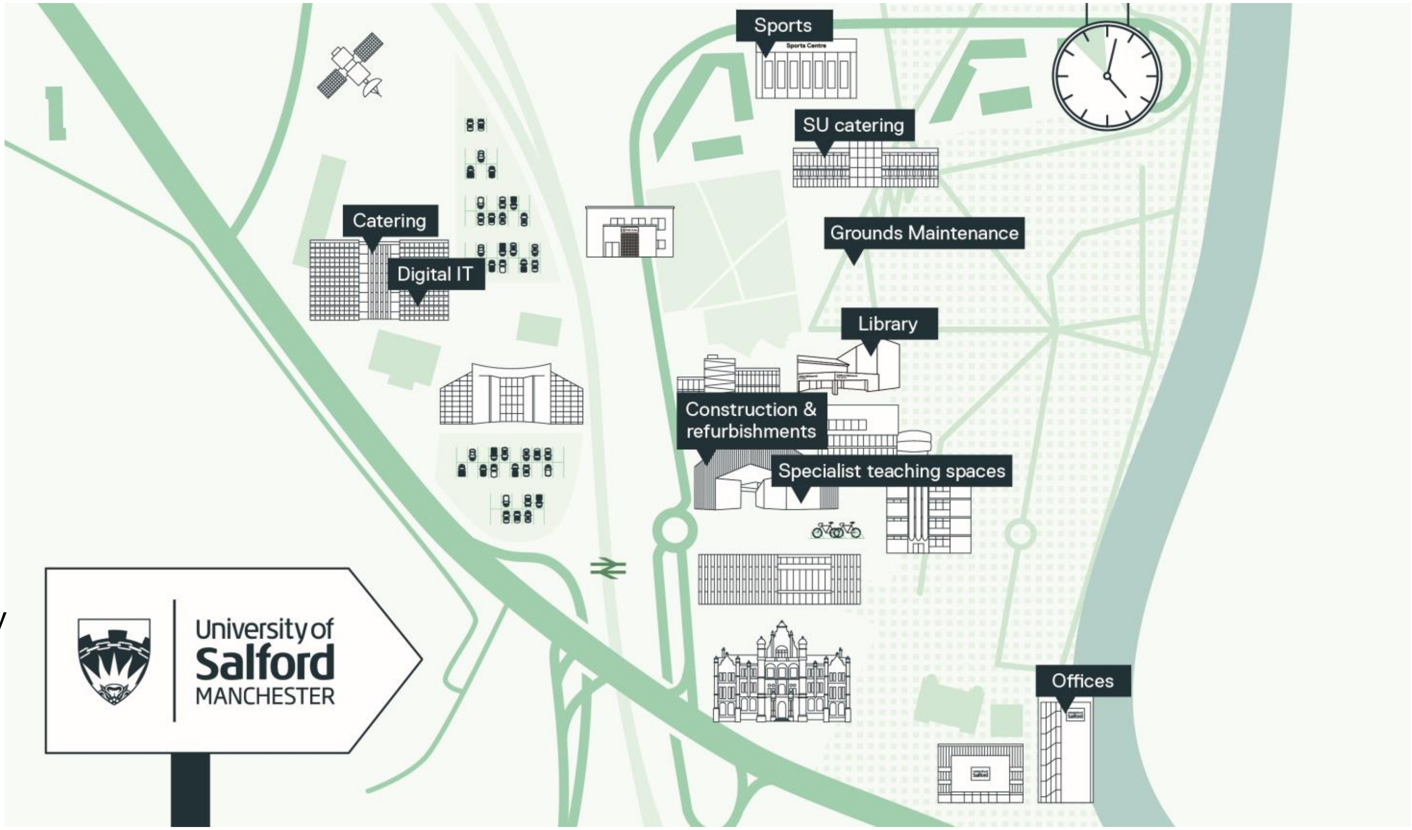
Our Carbon emissions

Scope 1
Direct emissions from activities owned or controlled by the University

- University controlled energy (gas used for gas boilers)
- University vehicle fuel
- Fugitive emissions

Scope 2
Indirect emissions from electricity consumed by the University that we do not own or control

- Electricity (excluding University owned electricity generation)

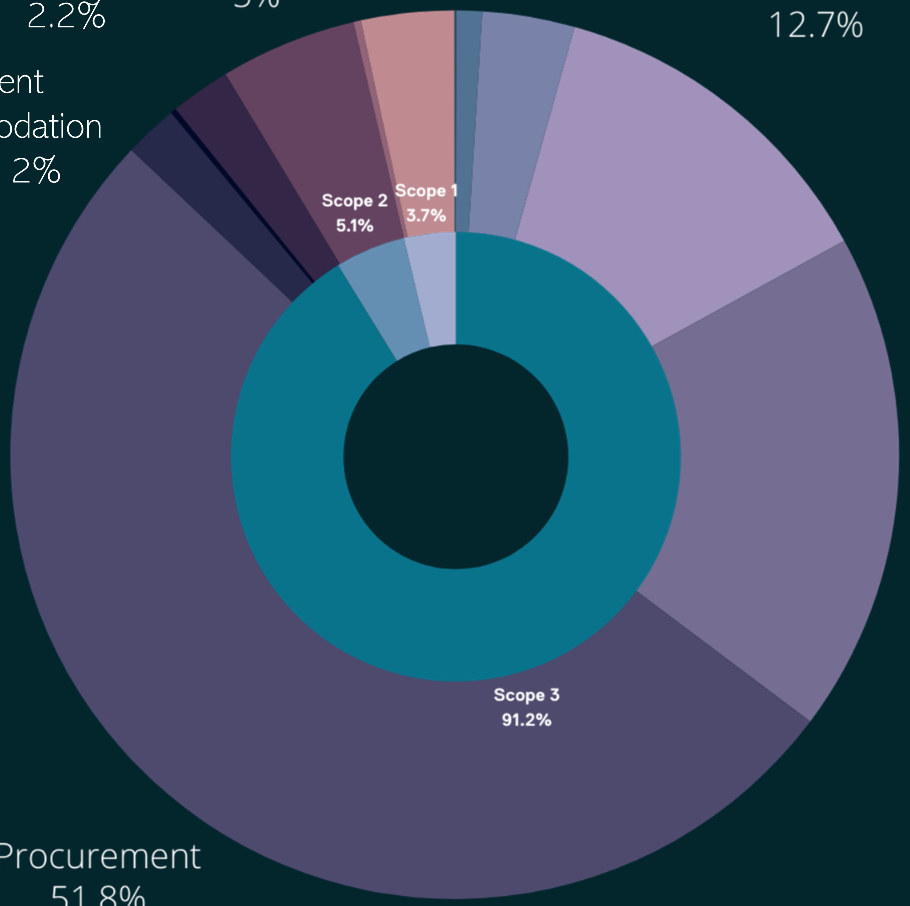


Scope 3
Other indirect emissions that occur upstream and downstream, associated with the University's activities

- Electricity & gas transmission and distribution
- Operational waste
- Water and waste water
- Student and staff commuting International student travel
- Business travel
- Procurement supply chain
- Student accommodation/leased assets

Sustainability at the University of Salford

Our carbon footprint 2022/23



Inner chart key

- Scope 1 – 4%
- Scope 2 – 5%
- Scope 3 – 91%

Sustainability at the University of Salford

Decarbonisation – the story so far

- First Carbon Management Plan launched 2011 – 43% reduction by 2020
- 61% reduction achieved by 2017/18 – energy efficiency, grid decarbonisation and estate rationalisation
- 70% reduction by 2022/23
  - Improved building analytics and controls to identify and eliminate energy waste – 36% reduction in gas use since 2016/17
  - ISO 50001 certification for Energy Management System, held since 2019
  - Sustainable Construction Framework to drive low carbon developments
  - Decarbonisation retrofit – Clifford Whitworth Building (PSDS funded)

70%

CO_2

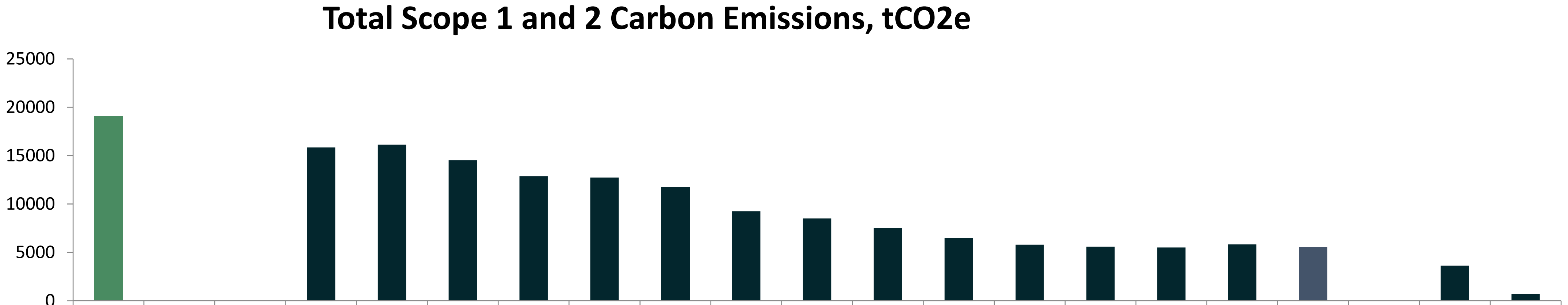
reduction in scope 1 and 2 carbon since 2005/6

nqa. ISO 50001 ENERGY MANAGEMENT

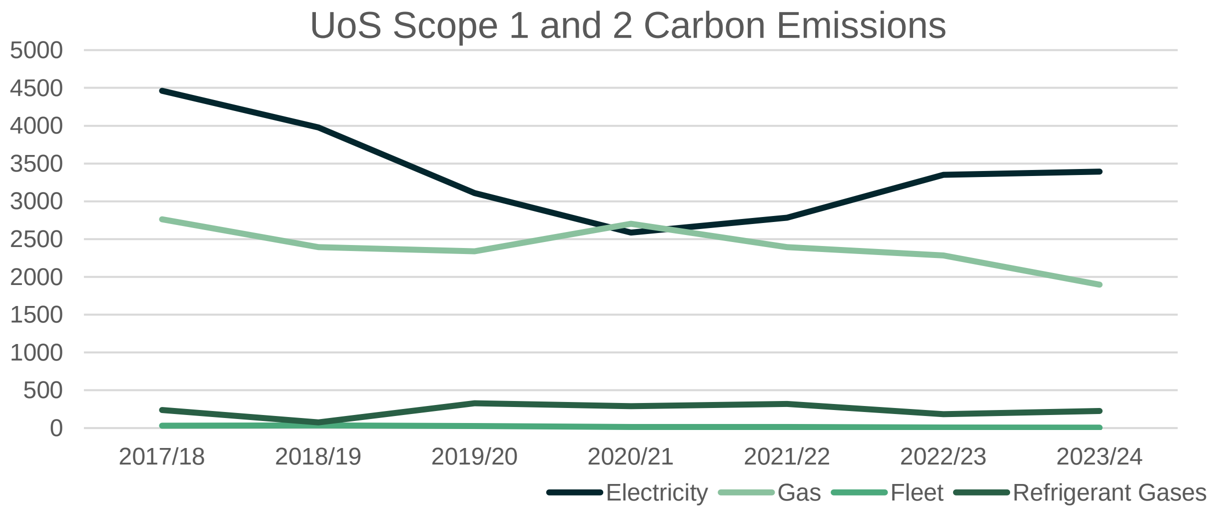
UKAS MANAGEMENT SYSTEMS 0015

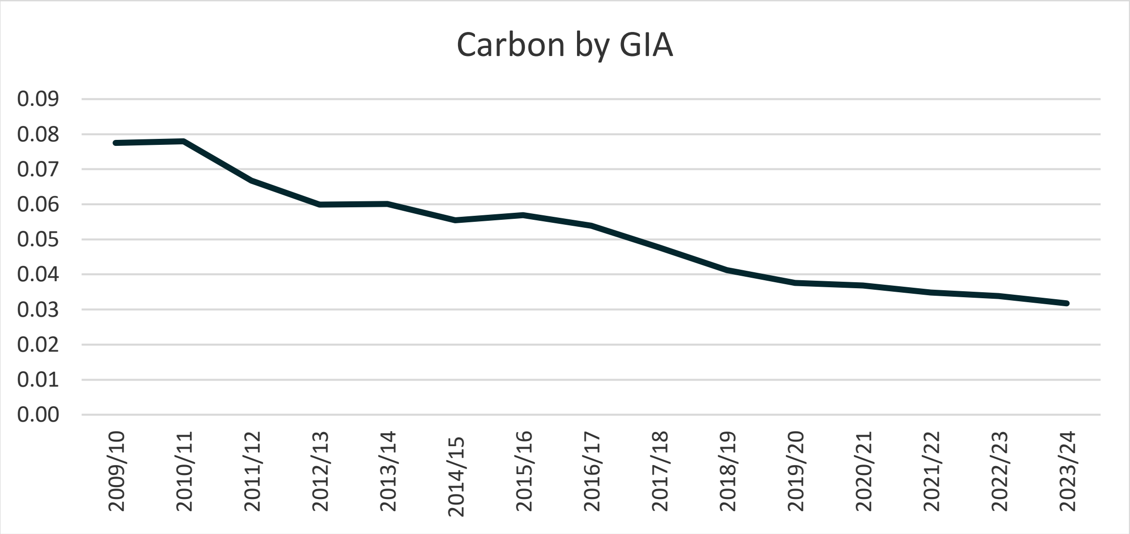
Net Zero Carbon by 2038

Scope 1 and 2 Carbon Performance Data



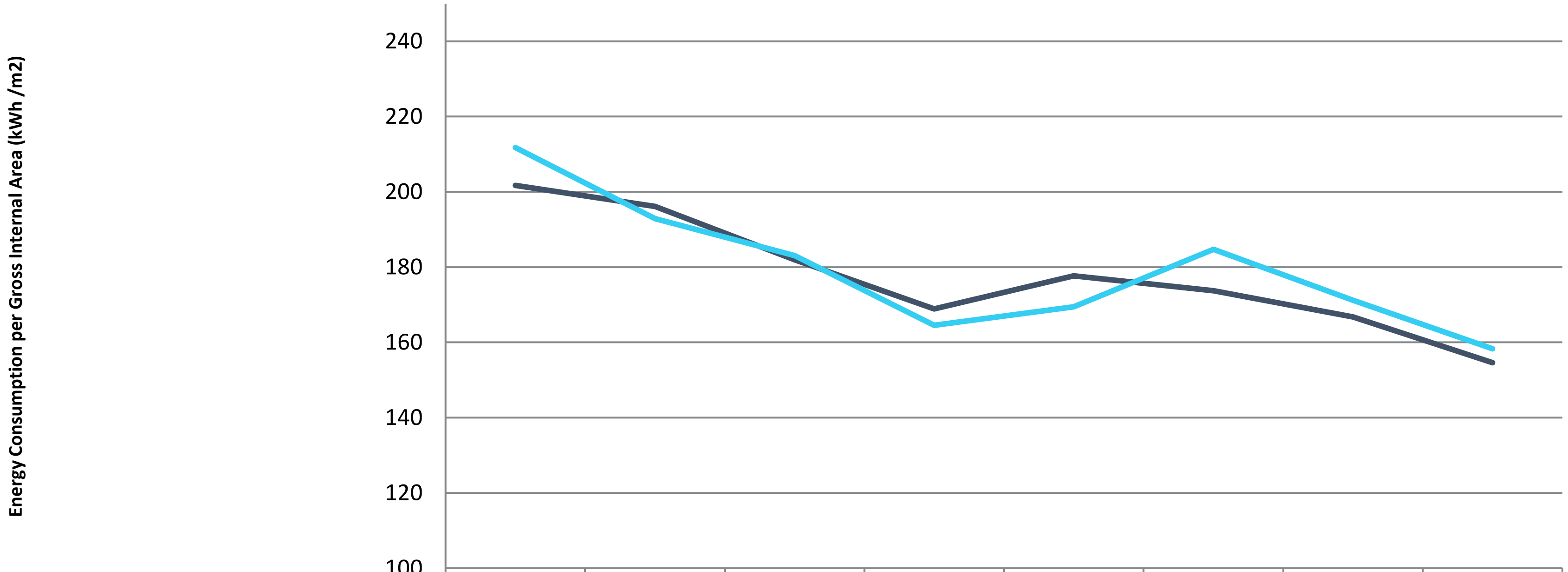
	2005/6			2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24		2030 Target	2038 Target
Total Scope 1 and 2 Carbon Emissions, tCO2e	19095			15856	16153	14515	12893	12747	11756	9263	8513	7491	6480	5800	5594	5509	5824	5527		3628	717





Energy Performance Data

Energy Consumption per Floor Area
Absolute and ISO 50001 performance (normalised gas and area data)



	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
kWh per GIA (Absolute)	202	196	182	169	178	174	167	155
kWh per GIA ISO 50001 Peformance	212	193	183	165	169	185	171	158

40%

reduction in gas use since baseline

25%

improvement in energy efficiency since baseline

0.5%

onsite renewable energy generation

Energy Sources

Low Carbon Energy sources	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Onsite renewables, %	0.00%	0.03%	0.04%	0.04%	0.04%	0.04%	0.22%	0.52%
Low Carbon Source (includes EDF Zero Carbon for business tariff and onsite renewables) GJ	50,558	52,004	50,413	43,483	39,142	43,932	52,886	54,155
Low Carbon Source (includes EDF Zero Carbon for business tariff and onsite renewables) %	44%	47%	49%	46%	40%	44%	51%	56%

Since 2016, the University has sourced energy through EDF from their Zero Carbon for Business tariff (previously Blue for Business) via The Energy Consortium. Zero Carbon for Business guarantees electricity supply is backed by zero carbon generation from nuclear generation. Zero carbon electricity purchased for Zero Carbon for Business is supplied into the national grid. Zero Carbon for Business customers receive electricity via the national grid, not directly from zero carbon generators.

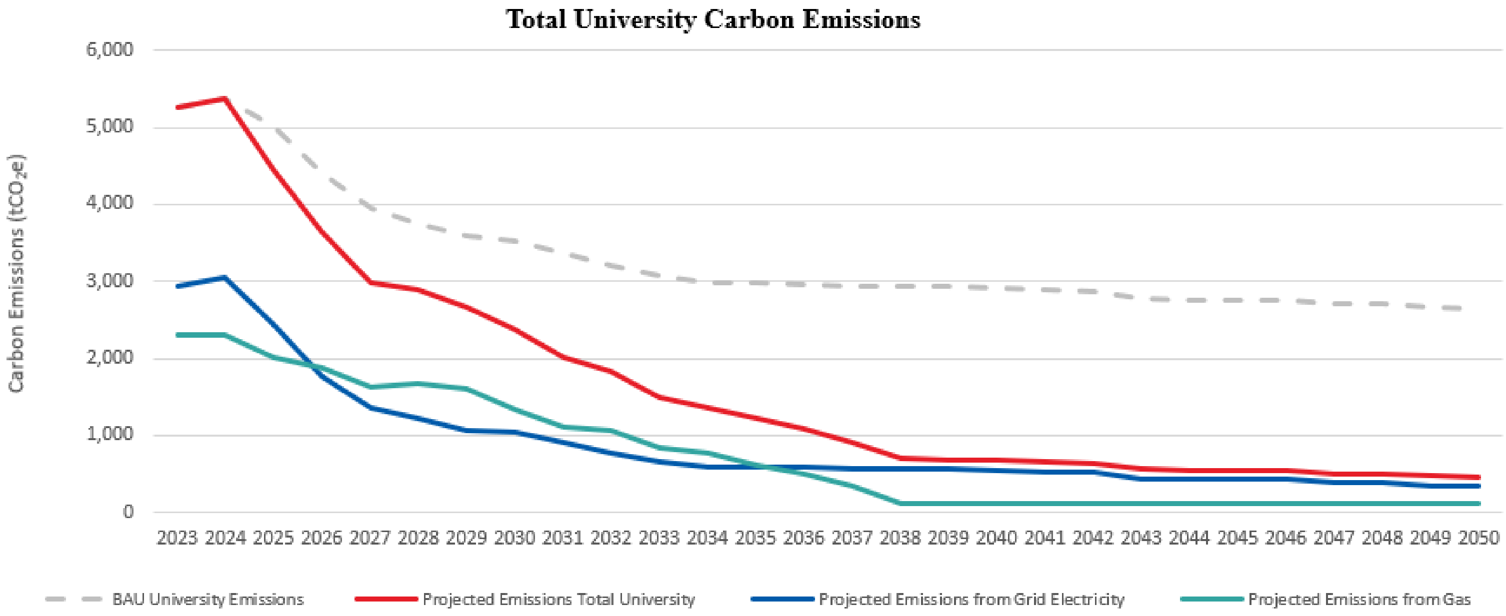
As identified by the UK Green Building Council, the procurement of renewable electricity in the UK currently has limited to no impact on emissions reductions due to sourcing from existing renewable sources or government subsidies, with overstated environmental impacts from most 'green tariffs'. Renewable energy procurement must create additionality to contribute towards a verified Net Zero status.

Power Purchase Agreement

A PPA is a direct agreement between a generator e.g. wind farm and a customer e.g. UoS to buy an agreed volume of power , at an agreed price over an agreed duration with the benefits being competitive pricing, price stability and access to zero carbon power from which zero emissions can be claimed in carbon reporting. The University is exploring options for a PPA to support the net zero carbon plan.

Decarbonisation Plan Milestone Targets and Business As Usual

Year	tCO2e	% reduction
2006	19,095	Baseline
2022	5,824	69%
2030	2,383	81%
2038	717	96%



The 'business-as-usual' scenario (red line) represents the current and future building emissions without any additional energy or carbon-saving initiatives for the University's buildings. This forecast estimates carbon emissions related to energy consumption data from the existing campus building stock, serving as a baseline for comparison. The graph shows the impact of the anticipated effect of the national grid decarbonising, yet the impact of the emissions related to natural gas remains constant. This ultimately leaves a gap of 2,948 tonnes of CO_2e in 2038.

Although grid decarbonisation is a national policy, there are some risks and challenges in relying solely on it, as the University has limited control over the pace and extent of these improvements. Whilst some of the newer buildings are electric, across the campus, buildings are still relying on gas boilers. In the BAU scenario, gas will contribute to 78% of the University's emissions by 2038. This demonstrates that relying solely on grid decarbonisation will be insufficient to achieve net-zero emissions without significant offsetting costs and considerations.

Net Zero Carbon Programme Management

Programme Sponsor:	**Mark Wantling** **Chief Information Officer**
Programme Lead:	Bec Bennett Assistant Director of Sustainability
Core Programme Team Members:	Professor Will Swan, Director of Sustainability Nigel Blandford, Sustainability Innovation Manager Phil Harris, Carbon and Energy Manager
Reporting:	University Sustainability Board, Strategic Portfolio Board

Programme Overview:	The University of Salford is continuing to add pragmatic, necessary steps and details towards its decarbonisation roadmap, with a visionary goal of achieving a net zero carbon campus in 2038. This high-level strategy, focuses on scope 1 and 2 carbon from the University estate outlining a pathway to transform the university's buildings, divesting from fossil fuel reliance by improving energy efficiency, electrification, as well as increasing on-site renewable energy sources. The plan was developed through stakeholder engagement, building surveys, and evaluations of existing constraints. The proposed measures outlined in this report will result in a reduction in carbon emissions of 96% on the University 2005/06 baseline in 2038. Previously the University has focused emissions targets based predominantly on scope 1 and scope 2 emissions. The scope has expanded in recent years to include measurable scope 3 emissions from business travel, waste, water, staff and student commuting and procurement. As part of this plan, we aim to set discreet reduction targets for each emissions source over the next few years, and improve the data quality of our reporting on Scope 3 emissions.

Sustainability Office

Do Now
Reduce Energy Consumption

Make Tasks
Transition Away from Gas

Schedule Projects
Decarbonise Key Buildings

Net Zero Carbon Programme Benefits

1. **Utility cost control:** a focus of the projects is energy efficiency which will reduce energy costs; payback periods and quantified savings will be reviewed for each individual project. The relationship between gas consumption and price is not linear and it's important to understand that a small reduction in consumption could lead to significant cost avoidance.
2. **Delivery of strategic objectives**: the key commitment of Net Zero Carbon by 2038 and the Sustainability Strategy will be supported through this project delivery. Net Zero Carbon by 2038 aligns with the Greater Manchester regional target and the Greater Manchester Civic University Agreement; one of the 6 priorities in this agreement was a commitment to Net Zero Carbon campus by 2038.
3. **University operations efficiency**: the projects will also support operational improvements within the University estate. E.g. lighting upgrades will improve the quality of teaching and learning spaces as well as provide a payback; centralising control, improving metering and installing more sensors and controls will enable automation and reduce the amount of FTE time in direct monitoring and housekeeping activities with additional benefits for user environment such as thermal comfort and responsiveness to issues, fabric improvements can help address building maintenance issues.
4. **Modernisation and resilience of the University estate**: within the existing estate some of the operational systems, such as the Building Management System (BMS) hardware, are reaching the end of their operational lifetime and resulting in significant energy and financial waste with plant and equipment running uncontrolled. This programme aims to support the modernisation and upgrading of this equipment, including the BMS. This will enable future technology such as SMART buildings and help build resilience within the estate for business continuity and future climate scenarios. A sustainable campus also supports health and wellbeing for staff and students, particularly through increasing biodiversity, our green space and active travel.
5. **Student experience and recruitment**: students are increasingly environmentally aware and motivated and are actively comparing environmental performance when choosing a preferred institution in which to learn. Demonstrating commitment and real action to tackle climate change will enhance the University's reputation and appeal and provide opportunities to work with students through academic and research programmes. They will also benefit from improved lighting and thermal comfort whilst in the campus environment
6. **Support for research portfolio**: we have the opportunity and potential to deliver real-world solutions for climate change mitigation and adaptation, building on both our well-established and developing areas of expertise including energy efficiency, Nature-based Solutions, environmental research, disaster resilience and sustainable homes. We have the potential to set an example and be at the forefront of sustainability. Increasing our focus and visibility of sustainability and practicing what we preach will support our pursuit of research funding related to sustainability and our industry partnerships. Better integration of our operational sustainability with teaching, learning and research will provide additional benefit and resource.

Net Zero Carbon Project Stakeholder Mapping

INTEREST

How invested are they in the activity either through personal interest or on account of how it will impact them?

HIGH

ACTIVE PLAYERS

Keep Informed

- University Sustainability Board
- Strategic Portfolio Board (SPB)
- Environmental Project Board (EPB)
- Funding bodies (e.g. PSDS)

KEY PLAYERS

Engage Closely

- University Leadership Team (ULT)
- Estates and Facilities colleagues
- Salford SU
- Salford City Council
- Greater Manchester Combined Authority
- Salford Crescent Masterplan group
- Electricity North West Ltd
- Greater Manchester Civic University Board
- Local press
- Local community & local business

LOW

SPECTATORS

Monitor

- University colleagues
- Student population
- Other regional universities / HEIs
- Environmental Association for Universities and Colleges (EAUC)
- HE focused media (THE etc.)
- Regional / National press
- Alumni
- National government
- Wider HE sector
- Campus visitors

INFLUENTIAL OBSERVERS

Keep Satisfied

- Current student population
- Future students (inc. 16-18yr olds)
- Prospective staff
- University industry partners
- University research partners
- Local government, MP and administrative bodies

LOW | **HIGH**

INFLUENCE

The power a stakeholder has to facilitate or impede the achievement of your objective (i.e. to what extent can the stakeholder persuade others into making decisions, and taking actions?)

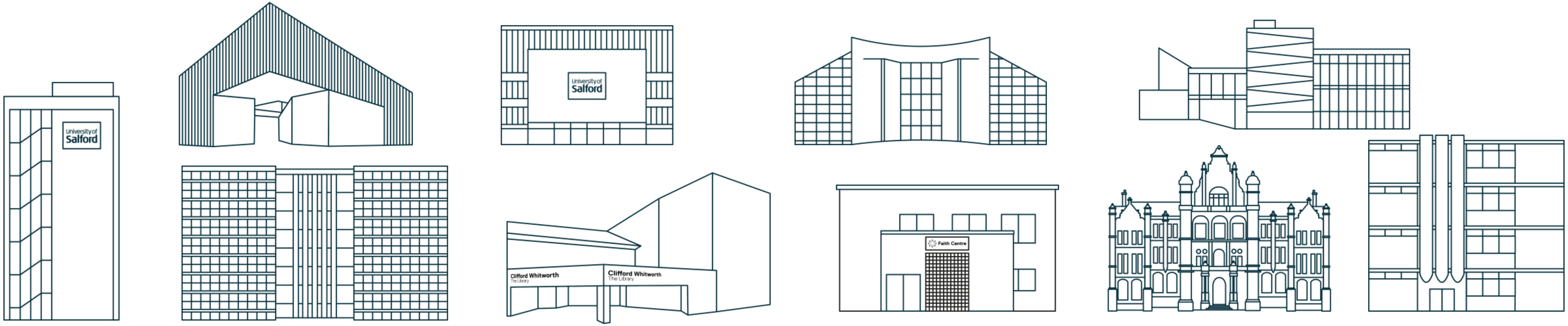
Our Buildings Decarbonisation Plan

A costed plan (costs available internally only) as to how we will replace existing, fossil fuel-reliant, systems with low carbon alternatives such as heat pumps, electric heating, or other low-carbon fuel sources within our estate through integration of energy efficiency measures that reduce overall heat and energy demand – a whole building approach.

While policies, internal and external factors, and priorities may shift over time, this report captures the core principles and strategic approach that should guide the decarbonisation efforts. The plan is supported by a dynamic NZC tool that allows the timeline and priorities to be adapted and tested as circumstances evolve.

Plan Development Methodology:

- Analysed current energy consumption patterns and infrastructure across the university's campus.
- Established baseline and projected business-as-usual (BAU) emissions for each building and overall campus through data analysis.
- Surveyed existing buildings to verify data and determine suitable interventions.
- Researched viability of energy efficiency and decarbonisation opportunities, assessing potential impact, feasibility, and cost-effectiveness.
- Engaged diverse stakeholders, including decision-makers, facility managers, and sustainability experts, to align with the university's strategies and priorities.
- Calculated projected carbon reduction potential for each initiative to prioritise and select the most impactful solutions.
- Assessed potential challenges associated with implementing the proposed decarbonisation strategies and provided recommendations based on this assessment.



Campus Buildings Survey

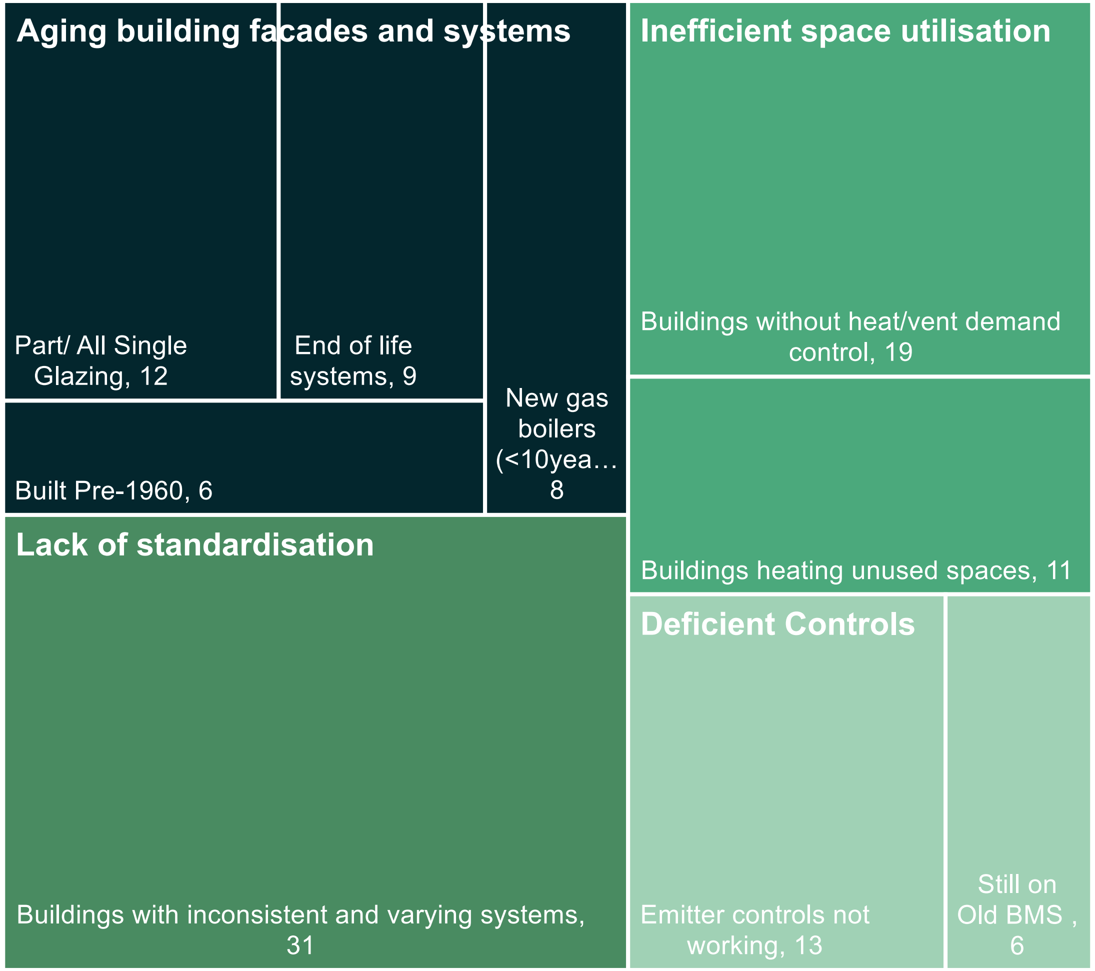
26 buildings were surveyed, alongside a survey of key University electrical infrastructure. Modern buildings with limited capacity for further decarbonisation, NERIC, Jack Goldberg Nursery and Salford Smart Home, were not surveyed. Buildings confirmed for planned demolition were also not surveyed and have not been considered for decarbonisation interventions. Other newer buildings such as SEE, Energy House 2, Lady Hale, and Media City Campus buildings and smaller buildings such as, Joule House, the Old Fire Station, and Faith Centre, had light touch surveys. The other University buildings had more detailed surveys undertaken.

The key headlines that have emerged from the building surveys are:

- The University Campus has aging building facades and systems
- Many buildings have deficient controls
- There is a lack of standardisation between the installed systems and their controls across the University buildings
- There is inefficient space utilisation.
- There are restrictions with electrical capacity for some areas
- Embodied carbon – repurposing/reimaging vs demolition

This indicates that a standard approach is not an appropriate solution, and bespoke and adaptable interventions are required. Our approach considers buildings individually within the context of the bigger picture phased delivery plan.

Survey Headlines



Current Position - Buildings Emissions and Electrical Capacity

Buildings Emissions

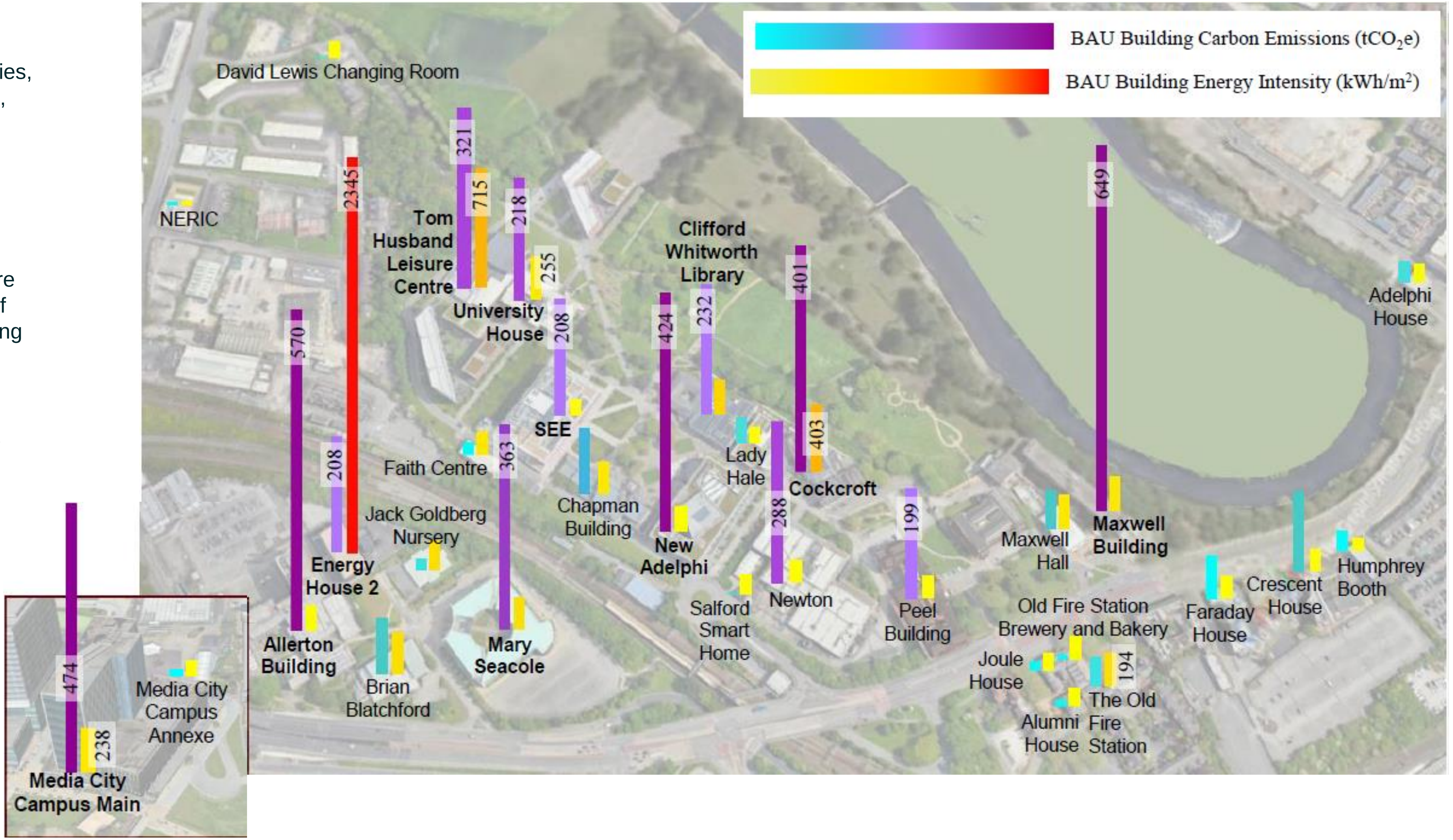
Several buildings have particularly high energy intensities, largely due to their process loads, such as laboratories, swimming pools, or workshop equipment requiring significant energy consumption. For example, the top three energy intensive buildings on the University campus, Energy House 2.0, Tom Husband Leisure Centre and Cockcroft, have large process loads.

The majority of buildings with high carbon emissions are the larger university buildings and, with the exclusion of SEE and Clifford Whitworth Library, are currently running heating systems on gas. The buildings with particularly high carbon emissions typically have a combination of issues, including poor building envelope performance (leaky facades), and/or poorly maintained systems and controls.

Electrical Supply and Infrastructure

This study aimed to understand the electrical supply infrastructure and its capacity across the campus. The agreed supply capacity and the available peak demand data were analysed to evaluate the current state where data was available.

The analysis shows that although there are some constraints, especially for some buildings on the Peel campus, that for most buildings across the campus some electrical capacity could be considered.



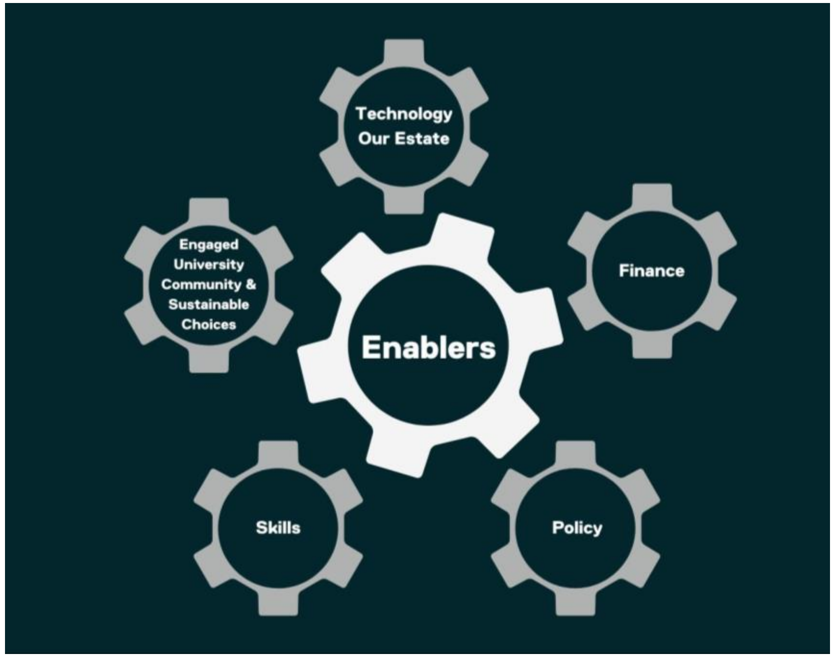
Buildings Decarbonisation Framework

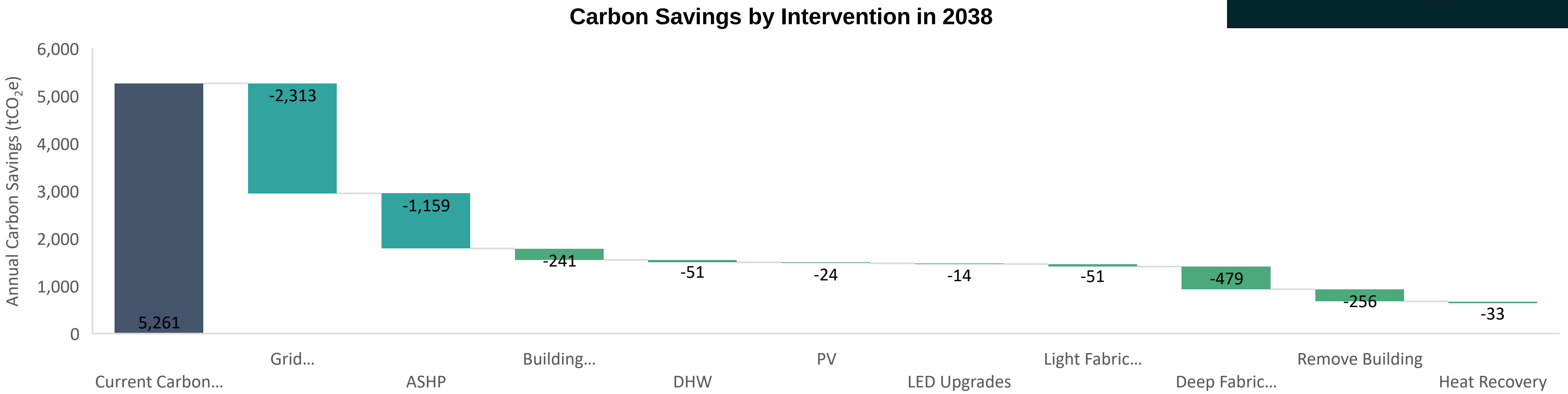
To decarbonise in scope 1 and 2, the University of Salford must reduce its total energy consumption, eliminate its reliance on gas across campus, and implement a whole-building approach for its major energy-intensive buildings, now and into future developments.

Our framework includes the following types of projects:

- **Energy Efficiency:** upgrades to Building Management System – controls and hardware, lighting upgrades
- **Renewable Energy Generation:** installation of solar photovoltaic panels on roof spaces
- **Electrifying Heat:** transition from gas to electric Air Source Heat Pumps for heating and domestic hot water
- **Fabric Improvements:** includes both light and major fabric improvements aligned to the transition from gas

To enable this we ensure we can support projects with appropriate finance (internal and external), identify, access and implement appropriately new technology on our estate, ensure we upskill our workforce, our policies align with a low carbon approach to operating and engage our University community.



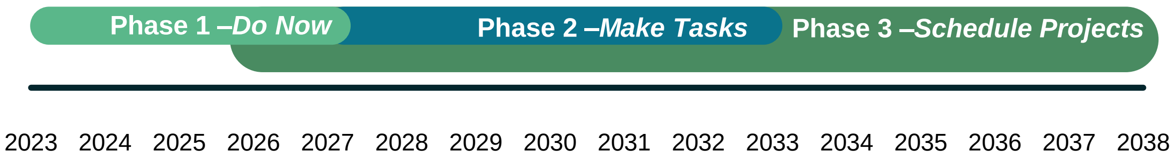


Delivery Plan

A phased approach allows immediate action on high-impact low effort actions while positioning the portfolio for long-term decarbonisation through planned energy transition work as well as major retrofit projects. This considers the findings from the survey, the desk-study undertaken to understand electrical constraints and the input from stakeholders. Through focused workshops and engagement with the university across departments and leadership, this strategy has sought to create a clear and pragmatic approach using a phased approach to ensure decarbonisation is achieved.

The three following themes should be central pillars for decision-making.

These have then been further categorised as specific building interventions that should be done immediately, interventions that should become part of ongoing maintenance plans or interventions that are required to become larger projects. It should be noted that project timelines will be adjusted based on developments within the Campus Connectivity Plan and where opportunities for funding are presented.



Do Now
Reduce Energy Consumption

Make Tasks
Transition Away from Gas

Schedule Projects
Decarbonise Key Buildings

Phase 1: 2025-2027, Do Now
The first phase prioritises high-impact, low-effort measures that can be implemented rapidly with minimal embodied carbon from new materials:

- Optimise building management systems and controls to reduce energy consumption
- Install on-site solar photovoltaic systems for renewable energy generation
- Upgrade to LED lighting coinciding with fluorescent phase-out

Buildings are prioritised based on prior PV feasibility studies, high energy intensity, operational issues identified during building surveys, and buildings where it has been identified that electrical capacity is likely already limited. This phase focuses on reducing energy demand and increasing on-site renewables as visible decarbonisation efforts.

Phase 2: 2028-2033, Make Tasks
The second phase involves actions implemented during routine maintenance/replacement cycles:

- Replace gas-fired equipment at end-of-life with electric air-source heat pumps
- Electrifying existing centralised domestic hot water plant or installing electric point of use water heater system
- Light fabric improvements

Starting with smaller buildings as a continuation of prototyping. Where feasible, pursue phased implementation across building systems. This part of the plan avoids premature asset replacement while transitioning to electrified heating over time. Integrate electrification of all-electric heating, cooling, and other systems

Phase 3: 2025 onwards, Schedule Projects
Phase 3 consists of comprehensive deep retrofit projects for high-priority buildings:

- Improve building envelopes through insulation, windows, airtightness, etc.
- Integrate electrification of all-electric heating, cooling, and other systems
- Consider total building performance, resiliency, and future climate impacts

These larger capital projects require additional planning, design, and financial analysis, and are thus spread out across the decarbonisation strategy timeframe.

Prioritisation Strategy 1

To achieve decarbonisation, a range of interventions were reviewed (described in the table below). To ensure that efforts and resources are directed towards the most effective and practical solutions, technical and non-technical considerations listed on this page have also been appraised to help develop the key decarbonisation pathways:

Intervention	Examples
Renewable Technology	Solar PV, Wind Turbines, Biomass
Building Optimisation	Refinement & Upgrades of Systems, Controls and Building Management Systems (BMS), Optimising HVAC Schedules, Demand-Controlled Ventilation
Energy Monitoring & Metering	Installing sub-meters, Energy monitoring software and dashboards, Automated Fault Detection & Diagnostics
Alternative Heating	Air Source Heat Pump (ASHP) installations, Ground Source Heat Pump (GSHP) installations, Electrifying Domestic Hot Water (DHW) systems
LED Lighting Upgrades	Upgrading old outdated fluorescent, incandescent, or HID lighting to LED fixtures and controls
Fabric Improvements	Replacing windows with high-performance glazing, Improving air-tightness and insulation levels, Adding roof insulation, Wall insulation (cavity or external), Floor insulation
Behaviour Change & Engagement	Energy awareness campaigns, Occupant feedback systems, Green Champions program

Energy Saving - The potential energy savings and impact on both gas and electricity use for each intervention is based on industry guidance, engineering judgement, and previous project experience.

Carbon Reduction – The annual average carbon factors forecast by the Green Book are utilised to determine predicted carbon savings from interventions.

Cost –The initial investment costs for interventions, based on industry guidance and experience, as well as the potential payback periods, are considered. It is noted that not all interventions will be cost-effective.

Timescales - Estimated durations for the planning and on-site implementation stages are provided to indicate how quickly carbon reductions could be realised.

Disruption – The interventions will require on-site work for installation and may require some parts of buildings to be temporarily unusable – minimising this will help ensure smooth implementation.

Skills & Capacity – The interventions will require resources for procurement, installation, and maintenance aligning this to current practice and allowing a growth in capacity to enact change.

External Impacts – alignment with planned and potential changes in policy or product manufacturing that could impact availability or

Alignment to Wider University Strategy – There are multiple internal factors that may drive interventions and priorities, regarding the masterplan and estate strategy. Where these have been provided, they have been accounted for.

Co-Benefits Created – Decarbonisation interventions also have a broad range of other benefits, such as resilience, public perception, and cleaner air, which should be taken into consideration

Prioritisation Strategy 2

To further support prioritisation a series of focused workshops were conducted, engaging stakeholders from various university departments and leadership. These workshops aimed to assess the impact, feasibility, and the University's readiness for implementing different interventions. The prioritisation strategy emerged from these collaborative discussions, balancing factors such as cost efficiencies, grid capacity, and the urgency of demand reduction.

The prioritisation strategy employs a two-fold approach:

- Prioritisation of interventions based on their impact, feasibility, and readiness
- Prioritisation of buildings within each intervention category, considering factors such as energy consumption, expected life span of plant and current age, as well as building complexity and occupancy patterns.

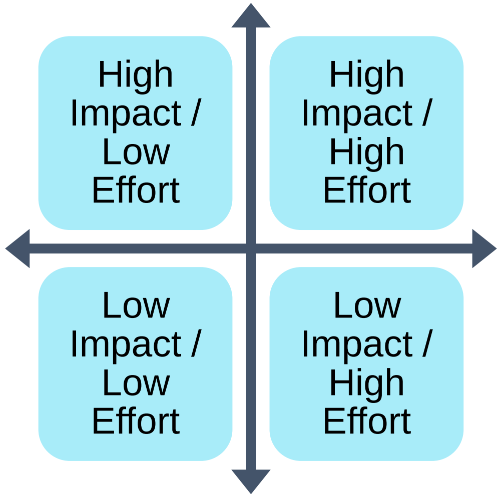
Balancing Act and Logical Order

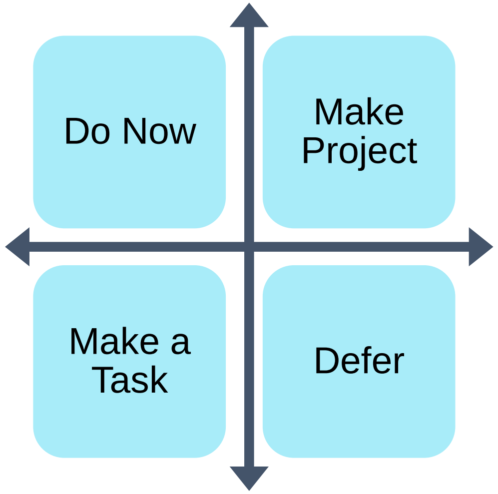
The prioritisation strategy strikes a balance between reducing electrical demand and transitioning buildings away from gas to electricity. The initial focus is on reducing electrical demand to unlock additional grid capacity, enabling the subsequent transition of buildings from gas to electricity while leveraging a decarbonising electrical grid

Impact and Effort Matrix

The interventions were evaluated based on their potential impact and the effort required for implementation. This assessment led to the following prioritisation:

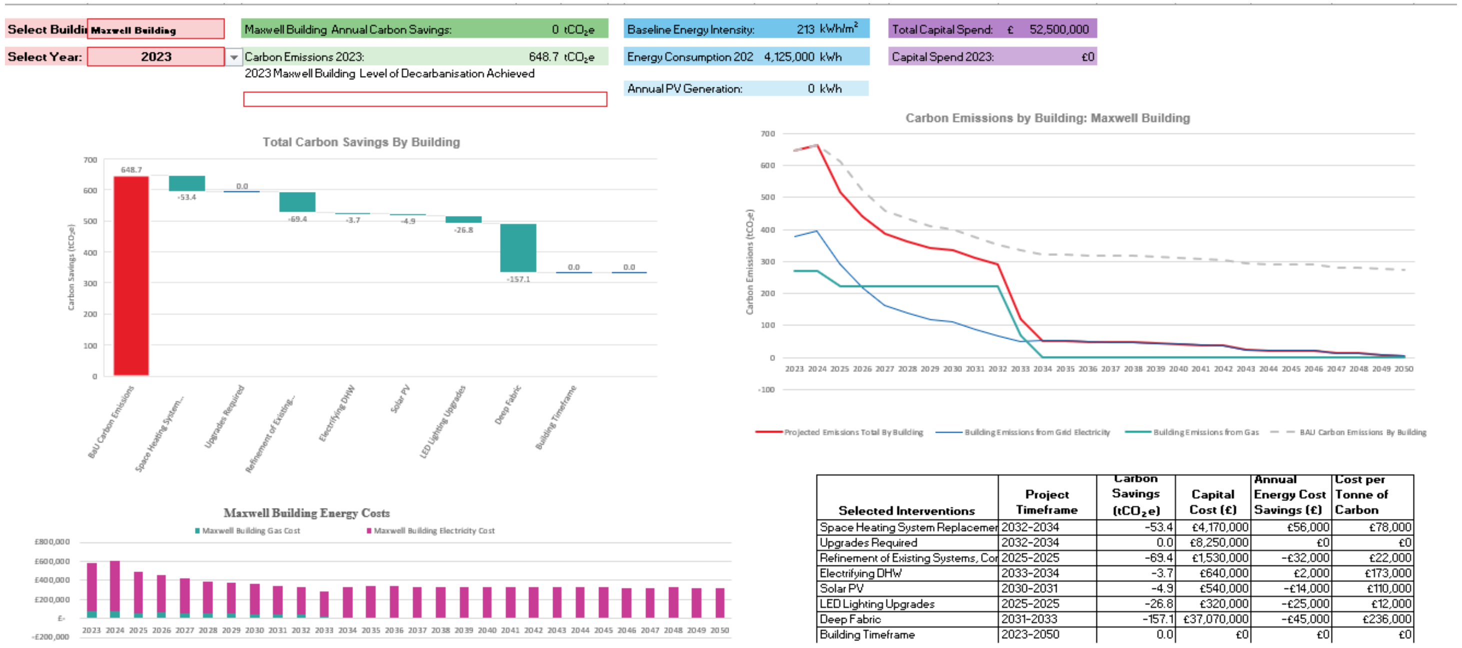
- High impact/low effort interventions were identified for immediate implementation – **Do Now**
- High impact/high effort interventions were designated as major projects requiring comprehensive planning and resources. – **Make projects**
- Low impact/low effort interventions were assigned as smaller tasks to be completed alongside other initiatives as part of ongoing maintenance. – **Make Tasks**
- Low impact/high effort interventions were deferred or reconsidered based on their relative importance and resource availability – **Make Projects**





Net Zero Carbon Tool

A dynamic, interactive and University managed tool which can support the planning of net zero carbon journey.



Selected Interventions	Project Timeframe	Carbon Savings (tCO_2e)	Capital Cost (£)	Annual Energy Cost Savings (£)	Cost per Tonne of Carbon
Space Heating System Replacemer	2032-2034	-53.4	£4,170,000	£56,000	£78,000
Upgrades Required	2032-2034	0.0	£8,250,000	£0	£0
Refinement of Existing Systems, Cor	2025-2025	-69.4	£1,530,000	-£32,000	£22,000
Electrifying DHW	2033-2034	-3.7	£640,000	£2,000	£173,000
Solar PV	2030-2031	-4.9	£540,000	-£14,000	£110,000
LED Lighting Upgrades	2025-2025	-26.8	£320,000	-£25,000	£12,000
Deep Fabric	2031-2033	-157.1	£37,070,000	-£45,000	£236,000
Building Timeframe	2023-2050	0.0	£0	£0	£0

An example building dashboard from our Net Zero Carbon planning tool

Delivery Plan

Decarbonisation Pathways

Phase 1 | Phase 2 | Phase 3

2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038

Do Now
Phase 1 – 2025 - 2027

Make Tasks
Phase 2 – 2028-2033

Schedule Projects
Phase 3 – 2025 onwards..

Energy Efficiency

- Building optimisation of large, complex energy intensive buildings undertaken as easy wins
- All electric buildings look to be more efficient

Electrifying Heat

- Small buildings will have building optimisations alongside energy source transitions
- Align larger complex buildings with full building refurbishments in the major projects schedule

Renewable Energy Sources - PV

- Undertake scheduled PV within the next couple of years, and any remaining PV in the following couple of years. Installation of the larger arrays undertaken in separate years.

Electrifying Domestic Hot Water

- DHW changes to electric systems are aligned to ASHP upgrades for programme efficiencies

Lighting

- Replace fluorescent lighting which is being phased out and will become obsolete with LED lighting as a priority
- Smaller buildings, or key public facing university buildings, with minimal non-LED lighting have been prioritised for LED upgrades
- Larger buildings with significant remaining LED upgrades required, such as New Adelphi and Peel building, are phased as larger projects which will require more funding. Aligned to major projects schedule where relevant.

Fabric Improvements

- Faraday Building – Major refurbishment
- Light fabric improvements aligned to transition from gas and installation of ASHP
- Major projects schedule linked to Campus Connectivity Plan

Finance and Funding

Costing Assumptions

To develop a comprehensive costed plan, our consultants used various assumptions were made to form the basis for estimating the financial implications of the proposed interventions.

The capital cost estimates are derived from a combination of sources, including:

- Experience from previous projects of similar scope and nature
- Industry-standard cost estimation guides (SPONS)
- Specific studies and supplier quotations

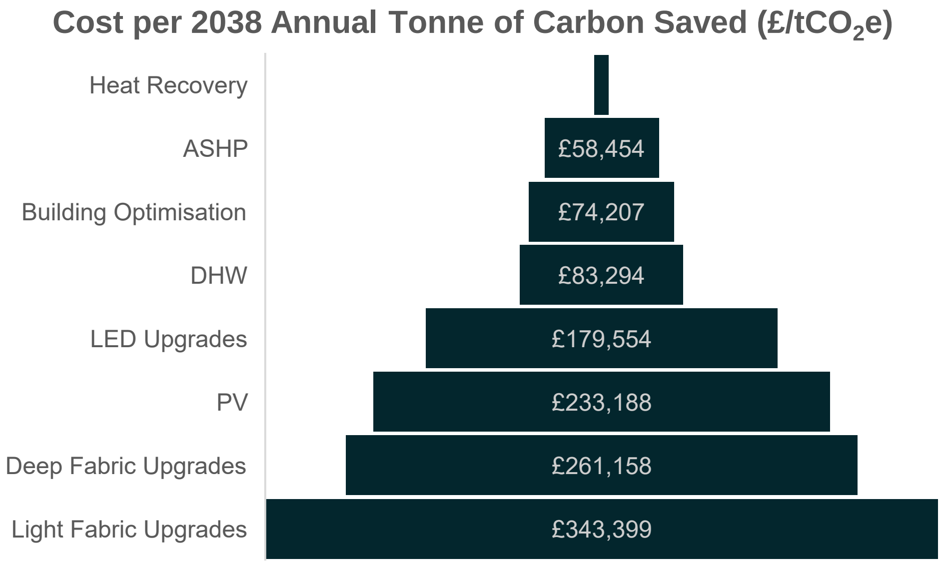
The cost rates take into account additional expenses beyond raw material costs, such as design fees, contractor preliminaries and profit margins, optimism bias, and VAT. This approach ensures a robust and practical cost estimation that reflects the real-world complexities of project implementation.

Full details of costing assumptions and methodologies are recorded, providing transparency and enabling informed decision-making.

Costing Findings

The high-level financial calculations undertaken highlight the significant financial investment required to achieve the decarbonisation levels aspired by the university.

This plan has adopted a strategic approach, prioritising cost-effective solutions that maximise the carbon reduction potential while considering the associated capital expenditure as well as the levels and routes of funding available. Assessments have been conducted to evaluate the potential carbon savings against the required investment, and any potential long-term financial savings have been factored into the analysis.



Finance and Funding 1

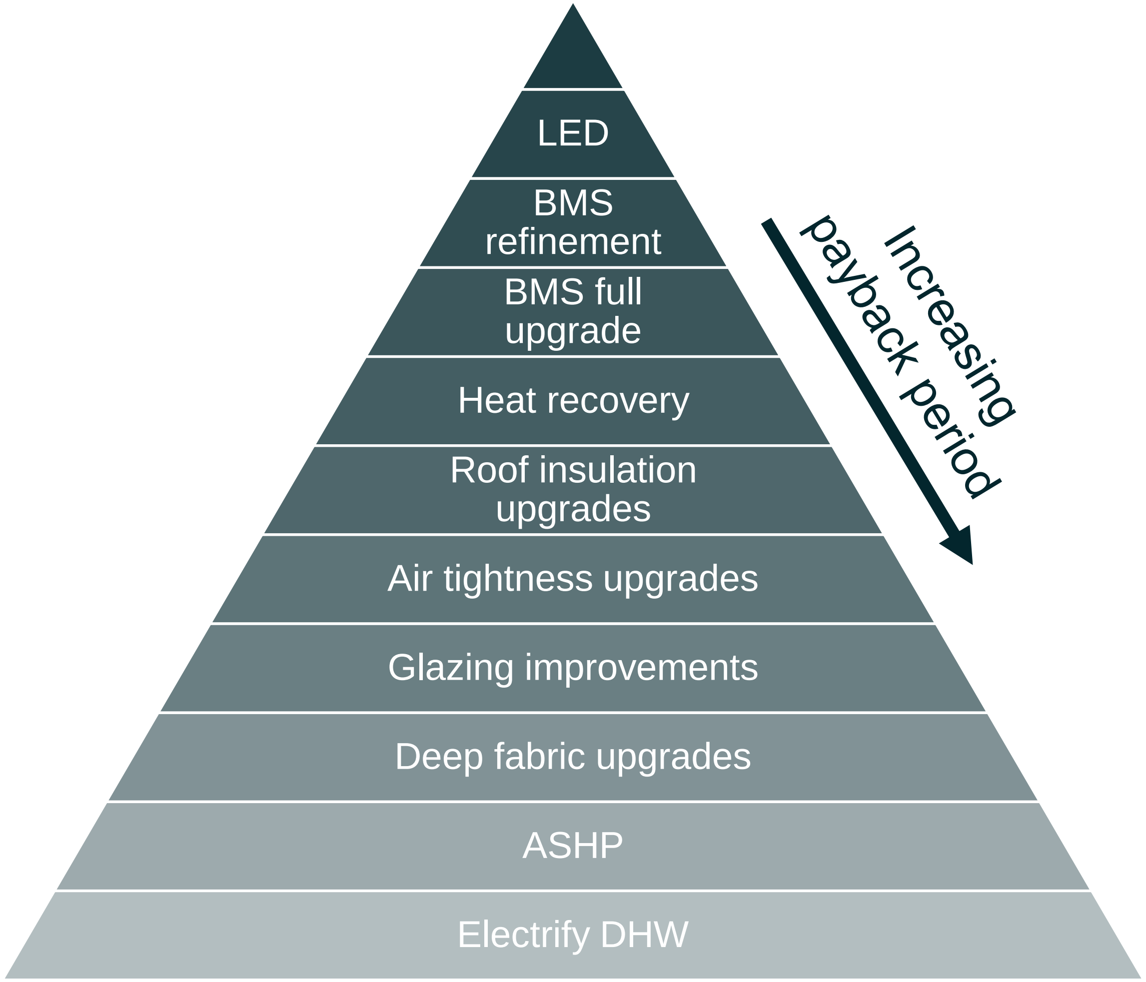
Payback Times

Typically, when evaluating intervention measures, it is standard practice to consider the payback time, which represents the duration required to recover the initial capital investment through the operational cost savings generated by the implemented measure. However, this approach can result in a skewed view of the investment. Currently, many of the capital investments required for decarbonisation may not result in favourable payback times. When considering the current energy market where electricity is significantly more expensive, the resulting energy cost savings by reducing gas (and thus carbon emissions) either lead to small decreases in price or when transitioning to electricity might even result in an increase in price. **Nonetheless, these investments are important and will significantly contribute to achieving critical decarbonisation efforts.**

Where there might be more favourable finance discussions are around the financial value when compared to future risks, trends, lifecycle costs and more in-depth financial modelling.

The financial modelling has made some basic assumptions regarding inflation and future energy costs based on Green Book data. The focus has been to identify and assess potential decarbonisation interventions based on their technical viability and carbon reduction potential, and to understand basic capital costs.

However, we recognise that financial considerations play a crucial role in the successful implementation of any proposed measures. Therefore, there may be value in including factors such as changes in specific tariff energy prices, tax implications, or additional economic analysis techniques like Internal Rate of Return (IRR) and Net Present Value (NPV) as a future consideration.



Finance and Funding 2

Lifecycle Costs & Maintenance

While upfront capital costs are often the primary consideration, it is equally important to evaluate the long-term implications of decarbonisation efforts on ongoing costs and maintenance requirements.

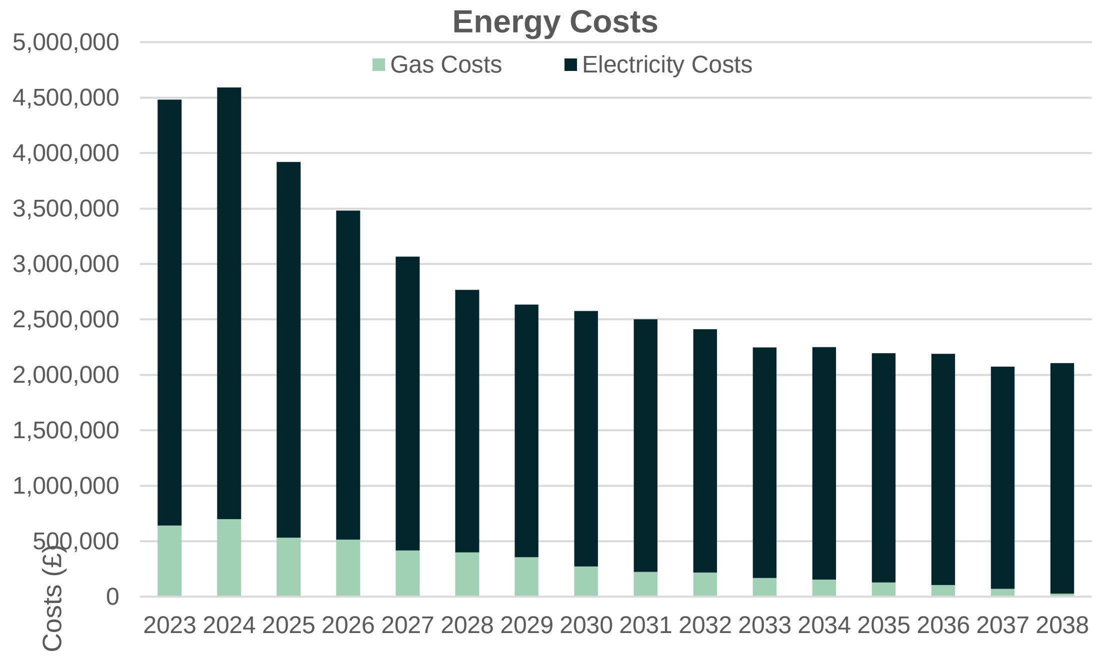
Energy Costs: Energy markets are inherently volatile, and recent global events have underscored the unpredictability of energy costs and trajectories. In the last few years, we have witnessed the profound impacts of crises on energy prices, highlighting the challenges in forecasting future trends accurately.

To enhance resilience and reduce reliance on grid energy, the University of Salford should prioritise the implementation of generating their own energy. While implementing energy-efficient measures and reducing consumption can help mitigate the impact of potential cost increases; reducing overall energy consumption remains the most effective strategy for minimising operational expenses in the long run.

Maintenance cycles: To reduce the need to find additional upfront capital expenditures, the proposed decarbonisation measures have been strategically timed to coincide with the expected end-of-life and replacement cycles for existing equipment and systems where possible. For example, rather than replacing functional gas boilers before their usable lifespan is complete, the plan accounts for their projected replacement timing based on age and condition. The proposed installation of air source heat pumps (ASHPs) and other electrified heating systems is scheduled to align with when the gas boilers would normally require replacement due to age or condition.

This approach allows the university to leverage its existing maintenance and replacement budgets that are already allocated for equipment renewal. By integrating decarbonisation efforts with these pre-planned expenditures, it is hoped that some portion of the needed funding can be sourced from capital reserves typically set aside for asset management rather than requiring entirely new capital outlays.

Where feasible, a similar structured timing approach has been taken for other measures like lighting upgrades, building fabric improvements, and equipment replacements. This methodology aims to smooth the financial impacts and minimise spikes in required capital funding solely dedicated to decarbonisation efforts.



Finance and Funding 3

Funding Opportunities

While some decarbonisation measures can be aligned with planned maintenance and equipment replacement cycles, larger projects will require additional capital funding. These scheduled projects typically involve complex, energy-intensive buildings that represent significant opportunities for carbon emission reductions.

The University has allocated budget within operational planning to support the Net Zero Carbon plan. Further internal business cases to call-off funding for specific projects is required to progress in line with internal governance procedures.

Where costs cannot be accommodated through operational budgets or economically justified based on energy savings alone, these projects will need comprehensive planning, design, and financial analysis. To manage the resource requirements, it is recommended that these larger capital projects be spread across the overall decarbonisation strategy timeframe.

The UK government aims to incentivise and support decarbonisation efforts to achieve Net Zero targets. As a result, there are grant schemes and funding opportunities that could potentially supplement the university's resources for these capital-intensive projects:

Public Sector Decarbonisation Scheme (PSDS)

The Public Sector Decarbonisation Scheme (PSDS), managed by Salix on behalf of the Department for Energy Security and Net Zero, presents a key funding opportunity. This scheme provides grants for public sector bodies to finance heat decarbonisation and energy efficiency measures. Over the past year, three phases of the PSDS have been launched, and projects identified in this Plan could be submitted for future phases. However, it's important to note that the current funding limit is £325/tCO_2e, which may limit the applicability of the scheme, and any funding gap would need to be covered by the University. Close attention should be paid to grant timing and financial schemes, as these factors are outside the University's control.

Low Carbon Skills Fund (LCSF)

Phase 5 of the Public Sector Low Carbon Skills Fund will provide up to £16 million of grant funding for the financial year 2024 to 2025. It is for use by eligible public sector bodies to access skills or expertise to unlock heat decarbonisation on their estates. This fund could be to undertake more detailed feasibility studies on the high-level recommendations in this report as well as detailed project designs, and specialist advice for the key projects outlined. The fund aims to support public sector organisations in developing and implementing strategies to transition away from fossil fuel-based heating systems towards low-carbon alternatives like heat pumps, district heating networks, or renewable energy sources which perfectly aligns with the suggestions made in this plan.

Having schemes ready to go

It is hoped that as the national target gets closer, political will and public perception raise, more funding and financing schemes will become available both from the government but also from private financial investment too.

Experience of previous government funding schemes suggests that the expected new funding schemes that will emerge in the next few years will likely have short application times, and the granted funding will have short windows in which it needs to be spent.

Developing a structured pipeline of scheduled projects, which are aligned with current available government incentives or can be aligned to future government schemes, and which utilise the University's internal financial planning, will enable efficient execution of the highest-impact decarbonisation initiatives over the long term

Finance and Funding - Offsetting

Net Zero and Offsetting

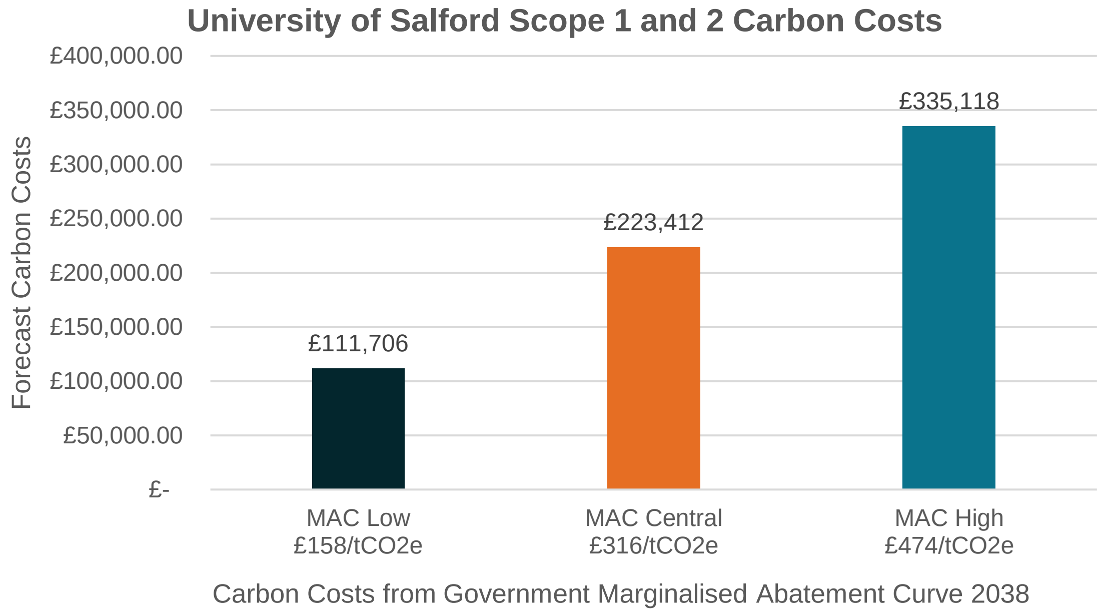
Carbon to Offset in 2038:
717 tCO_2e

Net Zero will be defined as where all related Greenhouse Gas (GHG) emissions have been reduced, beyond a science-based target in alignment with the Paris Agreement of limiting global temperatures to 1.5˚C above pre-industrial levels. These residual emissions are subsequently responsibly offset to achieve a sum of zero emissions. Net Zero can only be achieved by balancing reduced emissions with removal type offsets.

Recommended best practice for offsetting includes the establishment of an internal carbon price based on shadow pricing. Setting a carbon price that accounts for the cost of reducing greenhouse gas emissions and engaging in responsible offsetting can lead to substantial emission reductions, as it is often more cost-effective to adopt mitigation measures. This carbon price should be aligned with when emissions are expected to be released. Ideally, the price of carbon should be determined by the higher of two factors: the cost of abating emissions in accordance with a science-based decarbonisation pathway aimed at limiting global temperature rise to 1.5˚C or the cost of responsible offsetting.

There are multiple types of offsets as detailed below, the removal offsets should be preferred in line with *The Oxford Principles for Offsetting*.

The government has published forecasts for carbon costs which have been used to estimate a cost of carbon offsetting in 2038 based on the University's carbon emissions decreasing to 717 tCO2e as predicted by the decarbonisation tool based on proposed measures. Carbon costs are extremely volatile, and there is a large uncertainty around what it might look like to offset in 2038, thus the ambition for the University is that emissions are reduced as much as possible and we do not rely on offsets to achieve our net zero target.



Increasing Credibility →

← Increasing Risk of Greenwashing

Avoidance	Reduction	Removal
Avoidance Credits are certified when an offset project has successfully **prevented** any Greenhouse Gas (GHG) emissions which most likely would have happened, had it not been for that action, in the base case scenario.	Reduction Credits are certified when an offset project has successfully net **reduced** its own Greenhouse Gas (GHG) emissions beyond what is required by Science Based Targets when considering a whole life cycle GHG assessment.	Removal Credits are certified when an offset project has successfully Net **removed** Greenhouse Gas (GHG) emissions from the atmosphere when considering a whole life cycle GHG assessment.

Types of offsetting credits

Phase 1 Projects overview: Building Optimisation

Building Optimisation

Optimising building systems, controls, and BMS is the most immediate priority in the decarbonisation strategy as it reduces energy demand in a low effort high impact manner. The measure begins to reduce carbon intensive gas consumption immediately, where other measure are more difficult and slower to implement.

Building optimisation also reduces electricity consumption which unlocks capacity in an area impeded by restricted electrical capacity to assist the later transition away from gas to electrical energy sources in Phase Two. As part of this intervention focus should be given to optimising building systems to minimise peak electrical loads which is the critical issue for electrical capacity. For instance, spreading out the peak loads for different systems through varying equipment schedules as much as possible. Further details of some specific deficiencies to be addressed by building optimisation for each building can be seen in the building in the Appendix.

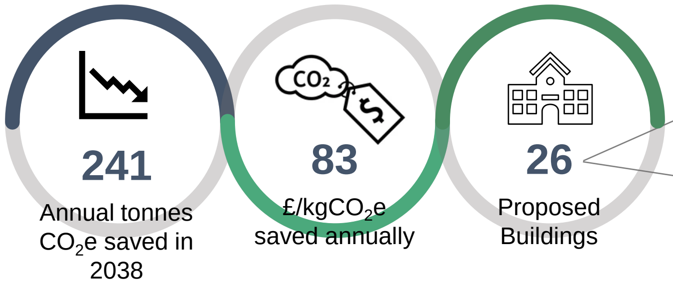
Prioritisation is given to buildings in the following order:

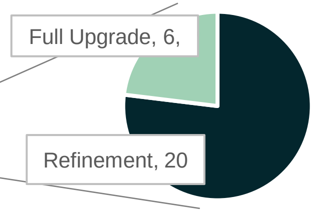
1. Buildings still operating on the Universities old BMS system, or where key plant wasn't connected to the new BMS
2. Where surveys identified broken equipment or poor maintenance of plant
3. Complex energy intensive buildings such as Tom Husband Leisure Centre and Cockcroft.

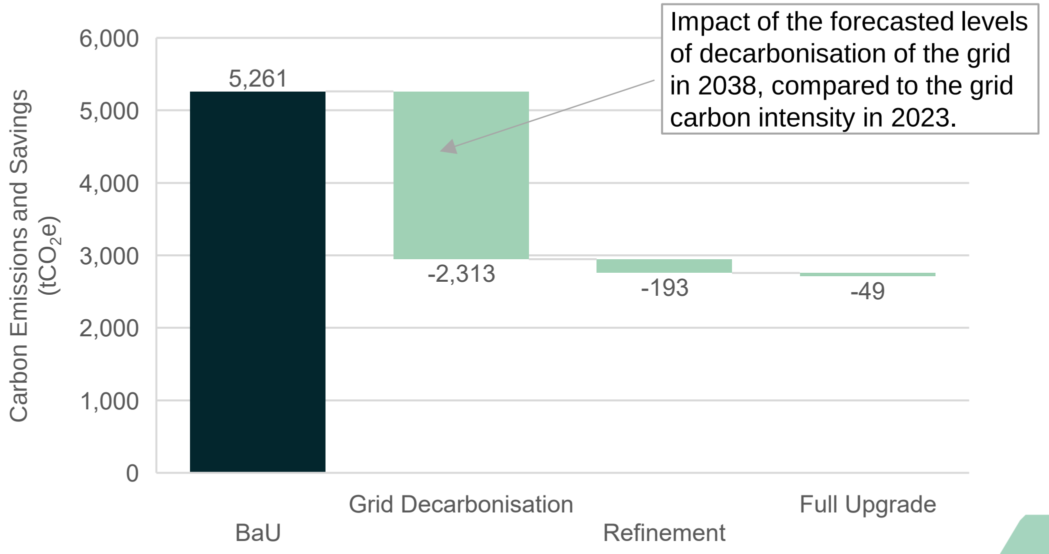
This intervention has two levels:

- Refinement of existing systems, controls and BMS – assumes 10% saving on energy.
- Full upgrade of systems, controls and BMS – assumes a 25% saving on energy.

The addition of new heat zoning within each of these intervention is estimated to provide a further 7% saving on space heating, this is proposed for 10 buildings.







Phase 1 Projects overview: PV

PV Installations

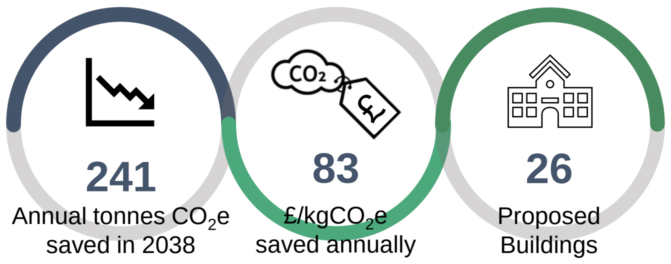
Building integrated PV installations will help to facilitate the University's transition from gas to electric energy sources. By providing an alternative electricity source, PV will reduce the University's reliance on the national grid, provided that the PV is not connected to the grid to export unused electricity. This will be critical in enabling buildings to have sufficient electrical capacity to transition to electrical energy sources.

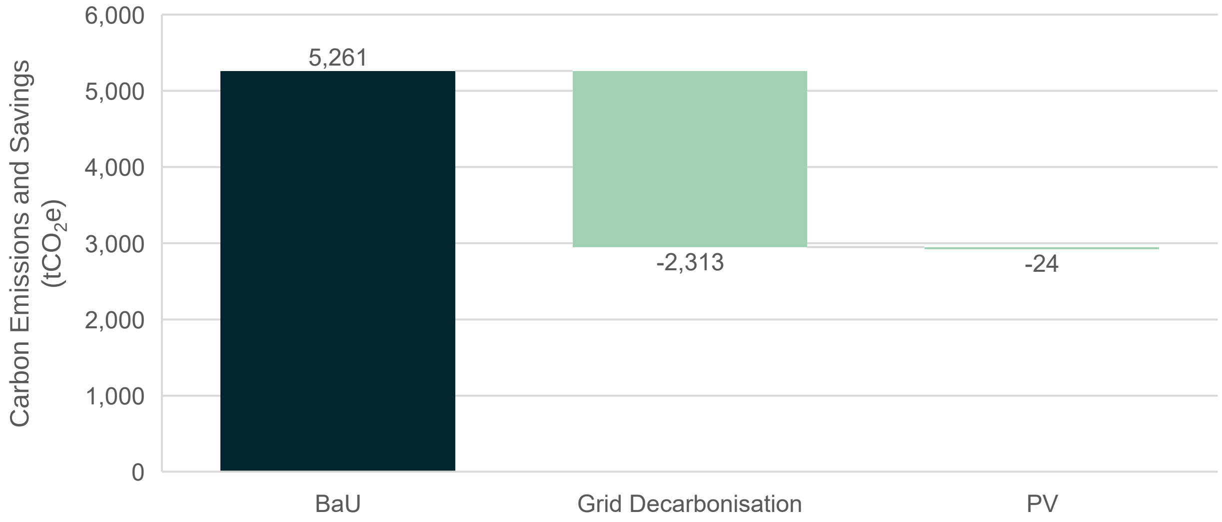
Any PV on buildings on the Peel Campus HV ring could effectively export to surrounding buildings on the ring utilising the existing private HV network infrastructure. This would likely be simpler than exporting energy as the feed-in tariff is uneconomic and ENWL would likely require payment for reinforcement works to support exporting. Additionally, PV on buildings which are on LV connections to the electricity grid managed by the DNO, such as Crescent House, Mary Seacole, etc. should avoid exporting PV back to the electricity grid. It's complicated when setting this out with the DNO and local infrastructure which, if it's old, may not be designed to take current the other way.

It is recommended that higher specification panels with higher efficiency factors are explored to maximise this energy source. This may come at a cost, however, the improved annual generation output, and further reduced reliance on grid electricity, will enable the university to further close the gap to net zero.

PV installations are prioritised in Phase 1, with this stretching into Phase 2, starting with buildings which have had feasibility studies undertaken recently, and then buildings with limited headroom on their authorised supply capacity.

Buildings with headroom on their authorised supply capacity could have PV installed as part of their larger refurb project.





Phase 1 Projects overview: PV further considerations

PV Installations – further considerations

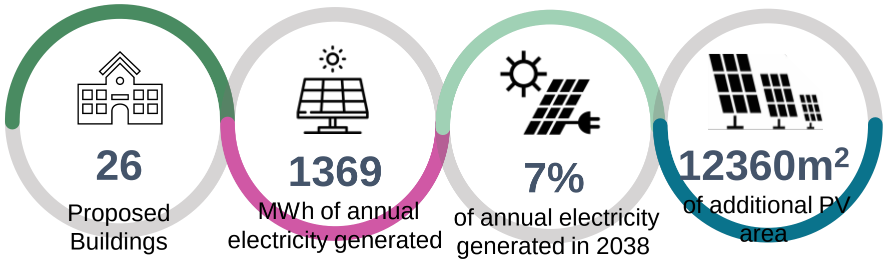
Battery storage and solar farm

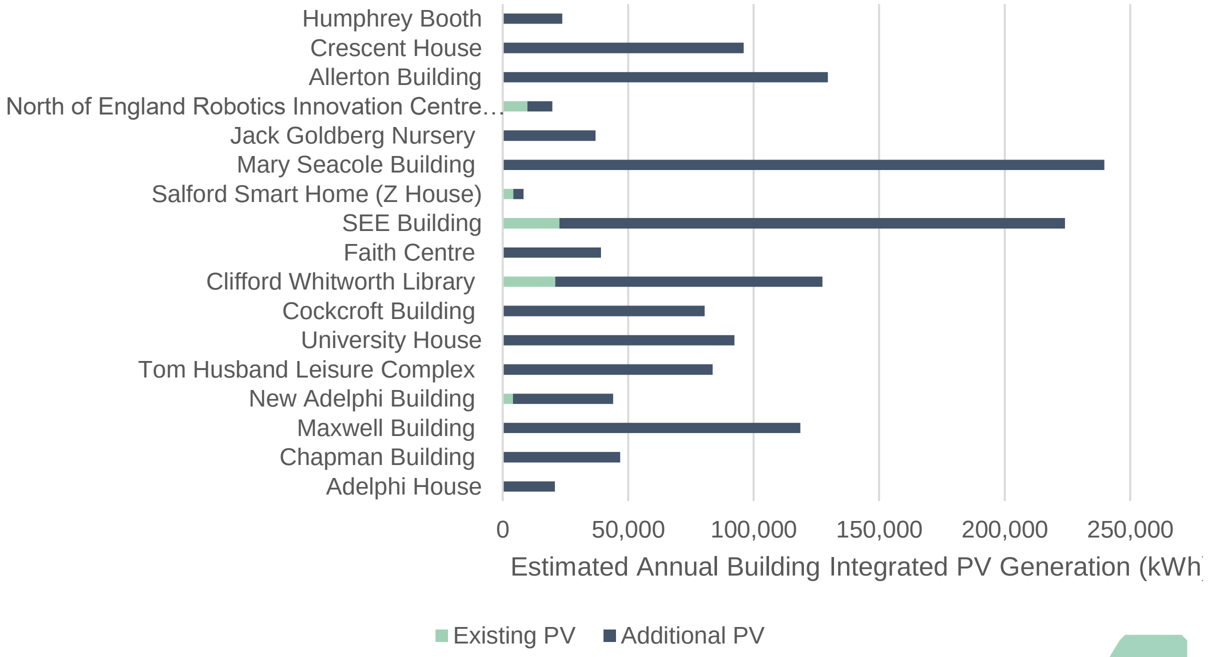
Battery Storage

As PV is not recommended to be exported to the grid, onsite battery store may be feasible. Considerations would need to be given to weight, position, location, size, etc. As the electricity peak usage is probably around midday when generation is highest. It would mainly be of benefit at the weekends when fewer buildings are in use and demand is lower, or over holiday periods in buildings which are largely student occupied.

Solar PV Farm

The proposed PV additions are estimated to supply 7% of the University's total electricity consumption in 2038. This proposal only considers building integrated PV and is constrained by the roof area of suitable buildings. Listed buildings, buildings in conservation areas, or where the loading capabilities of the roof is a concern, are not considered suitable. To further expand this renewable energy supply, the University could explore the potential for a larger solar PV complex within their land. This could be in existing land or further land could be purchased for this purpose. There is potential for a project of this type to be funded as part of a third-party collaboration. By maximising the amount of renewable energy that the University generates, the University reduces its reliance on third party supplied energy sources, such as gas and grid electricity, in which it is susceptible to fluctuations in price.





Phase 1 Projects overview: LED

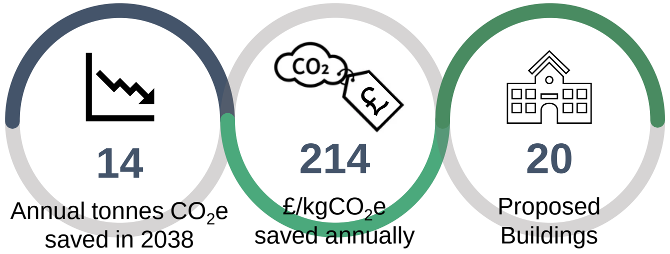
LED Upgrades

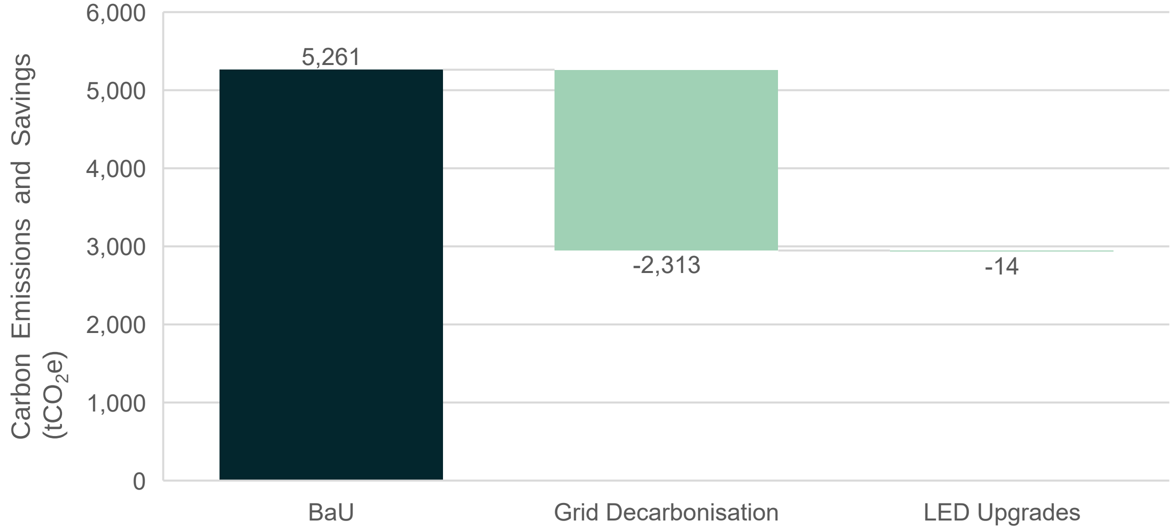
Replacing outdated fluorescent lighting

Upgrading the fluorescent lighting to more energy efficient LED lighting forms a part of a wider maintenance strategy. With a range of fluorescent lighting having been or being phased out of production, the existing fluorescent lighting will not be able to be replaced when it breaks unless it is upgraded.

While upgrading LED lighting is an easy way to reduce the campuses' electricity consumption, it does not result in significant savings. Thus, it should be aligned to the end of life of the current lighting, or the existing maintenance plans to replace outdated lighting, when it will be necessary to spend money on new lighting.

Upgrading the lighting solely to reduce the university's carbon emissions is not recommended. However, as the lighting systems undergo their natural replacement within the next decade due to obsolescence and the need for new fixtures at the end of their lifespan, this study has shown it will make some small steps to help the university on their decarbonisation journey





Next Steps – 2024/25

Action	Details	Date
Net Zero Carbon Tool	Maintain tool with Campus Connectivity Plan updates and data as required	Ongoing
Access internal funding	Confirm Phase 1 projects and develop business case to ‘call-off’ internal funding	January 2025
Access external funding	Consider PSDS Phase 4 application to accelerate appropriate Phase 2 projects	November 2024
Resource Assessment	Conduct a thorough review of the resource requirements for the University's project delivery team to effectively implement the decarbonisation plan. Ensure adequate staffing levels and expertise are available.	February 2025
Training and Upskilling	Develop a comprehensive training programme to ensure the delivery teams possess the appropriate knowledge and skills for executing net-zero carbon projects successfully.	December 2025
Scope 3 Carbon	Advance data analysis and scope 3 carbon targets alongside action plans for Sustainable Travel and Responsible Procurement	December 2025